



SIGMA COLLEGE OF ARCHITECTURE

Moododu, Anducode Post, Kanyakumari District, Tamilnadu - 629 168

Website : www.sicarch.com E-mail : sigmagroup155@gmail.com

Contact : 04651 - 209 039 Mobile : +919443370072



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ANCIENT HUMAN MIGRATION “A Remarkable journey”

Ar.S.CHINNADURAI M.Arch
Head of the Department



Homo sapiens began **migrating** from the African continent and populating parts of Europe and Asia. They reached the Australian continent in canoes sometime between 35,000 and 65,000 years ago. Scientists studying land masses and climate know that the Pleistocene Ice Age created a **land bridge** that connected Asia and North America (Alaska) over 13,000 years ago. A widely accepted migration theory is that people crossed this land bridge and eventually migrated into North and South America.

The development of **language** around 50,000 years ago allowed people to make plans, solve problems, and organize effectively. We can't be sure of the exact reasons humans first migrated off of the African continent, but it was likely correlated with a depletion of resources (like food) in their regions and competition for those resources.

A STUDY OF THE CHANGING SCENARIOS AND CHALLENGES OF REAL ESTATE MARKET

Ar.R.REGHU M.Arch
Assistant Professor

Introduction:

Real estate is a business, not a profession. Real estate is sometimes inaccurately spoken of as a profession, but it is essentially a business. A profession applies science, art or learning to be of use to others, the profit to the professor or person applying it being incidental; whereas a business is primarily engaged for profit, and the profit is to the one engaged in the business. A profession implies professed attainment in special knowledge. A person may engage in business with or without special knowledge and no one else is concerned with the question whether he has any knowledge of the business, because no one else is affected by the result. If he is successful the rewards are his; if he fails he bears the loss. But let him attempt to practice a profession and, if he be unskillful, others are directly affected, and the fact that his reward is diminished, thereby is merely incidental to the fact that others suffer.

Aim:

To Identify the Changing scenarios and Challenges of Real Estate Market in Greater Chennai

Scope of the Study:-

Sequential Scope:-

For the purpose of study, mainly the duration of the development is considered. Where ever required orientation will make to the preceding and existing conditions.

Geographical Scope:-

The study has been generally constrained to the Chennai state.

Functional Scope:-

The intention of the study is to attain information on the performance of real estate sector for benefit of families and to be familiar with the government policies for real estate sectors.

Objectives:

- To evaluate the methods of progress and constrains in real-estate development in India.
- To assess, the inputs of real-estate sectors in generating income source and employment opportunity.
- To compare, the growth and challenges throughout the Foreign Development Investment Policy.
- To convey the factors accountable for the real-estate sector's growth.
- To estimate the challenges faced by real-estate sectors in India.
- To learn the basic factors affecting the real estate value.
- To present the outlook constraints of real estate speculations in India.

Problems:

In the projected research work, the aim in finding out appropriate solution for the subsequent challenges or problems faced by real-estate sector in Chennai district.

The key challenges that the real estate industry is facing today are:

- lack of clear land documents and availability,
- High property prices,
- lack of adequate sources of finance,
- shortage of labour,

ARCHITECTURE AND NATURE: A FRAMEWORK FOR BUILDING IN LANDSCAPES

Ar.R.ANAND GODSON M.Arch
Assistant Professor

Building in nature constitutes a contradiction, as architecture enables immersive access to the landscape, while at the same time, natural landmarks are being slowly engulfed by tourists. The human presence in natural landscapes is an interplay of scales, a juxtaposition of archetypal shelters against the vast sceneries, as well as a negotiation between access to the landscape and environmental conservation. Exploring a variety of attitudes and formal strategies, the following takes a look at what could be learned from the experiences and design philosophies of several architects and practices that have perfected ways of addressing architecture in the landscape. The relationship of man to nature and of architecture to the landscape is continuously renewed, and architecture built within the natural landscape represents a certain kind of poetic exploration, as well as a renewed perspective on the human scale. The current architecture in the landscape is the product of a specific view of the relationship between human beings and nature. More than ever today, there is an awareness of the landscape as a precious heritage that architecture can and should enhance while protecting it to be passed on to future generations. The myriad of briefs and design proposals for objects in natural settings, be it cabins, observation towers, shelters that are a constant in the architectural news chicle reflect an ongoing preoccupation with a mindful creation of habitable places in the landscape. Distilling the ideas and design methods of several architects and their projects, the following represents a framework for building in the landscape, juxtaposing architecture and nature and underlining the intrinsic qualities of both.



THE ALLIANZ ARENA, MUNICH – ILLUMINATED FACADE

The first Stadium with a complete Colour changing exterior

Ar.M.RAGHAVENDRAN M.Arch
Assistant Professor

The **Allianz Arena** is a football stadium in Munich, with a 75,000 seating capacity. Widely known for its exterior of inflated ETFE plastic panels. It is the first stadium in the world with a full colour changing exterior. The stadium is designed so that the main entrance to the stadium would be from an elevated esplanade separated from the parking space consisting of Europe's biggest underground car park. The external architecture of Allianz Arena is made up of 2,874 diamond metal panels of ETFE (ethylene-tetrafluoroethylene copolymer) at a pressure of 35 hPa. Each panel can be illuminated in white, red or blue. The intention is to illuminate the panels to match with the colors of the respective local team, or white when the local German team plays. The roof of the stadium has built-in roller blinds which may be drawn back and forth during games to provide protection from the sun. Later, this innovative stadium-facade lighting concept has been subsequently adopted in other arenas too. It evolves such luminosity that the stadium can easily be spotted even from a distance of 80 km. There are little dots on the panels. When viewed from far away, the eye combines the dots and sees white. The foil has a thickness of 0.2 mm, each panel can be independently lit with white, red, or blue light. The panels are lit for each game with the colours of the respective home team. White is also used when the stadium is a neutral venue. Other colours or multicolour or interchanging lighting schemes are theoretically possible, but Munich Police strongly insists on uni-colour only due to several car accidents.



FIRE AN ELEMENT OF NATURE AND ITS INFLUENCE TO ARCHITECTURE

Ar.N.NISHYA M.Arch
Assistant Professor

Five elements of Nature are Earth, Water, Fire, Wind and Sky. Fire integrates with architecture by designing the openings of the building to get maximum light and minimum temperature, radiation. More explanation with examples as follows:

Five Elements of Nature: **Fire**

Integration with Architecture: **Light**

Light is a medium that allow us to see the beauty around us. Buildings designed to give maximum delighting to the occupant saves the energy used by the building. Buildings can be designed with proper openings to get maximum delighting to the interior. Other parameter to be considered for lighting is the type of glass used in the opening.

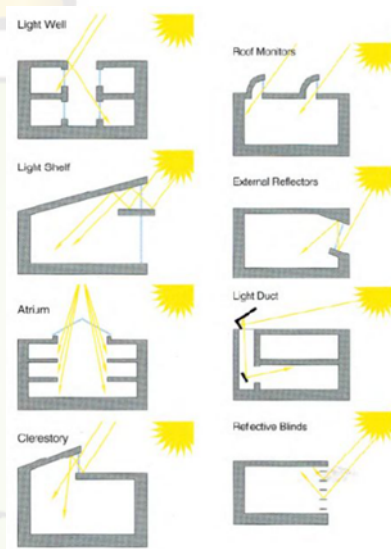


Figure 1 Opening in Roofs and its effects of Lighting

Integration with Architecture: **Temperature**

Temperature of a place changes depending on their location and other Climatic Factors. It won't be appropriate to follow same building design type throughout the globe as the world has different climatic Zones.

Following are the examples of Housing types for different Climatic Zones:

Igloo – extremely cold zone

Mud buildings – Hot Dry climatic zones

Open plan – Hot Humid Regions



Figure 2 Igloo for Extremely cold Regions

Integration with Architecture: **Radiation**

Radiation is a heat transfer mechanism in a building through conduction and convection. Materials used in the building plays an important role in heat transfer to the interior of the building as well as the temperature felt by the occupants.

U- Values of the building material is associated with the he heat transfer to the interior based. Based on the heat transferred to the interior the occupant thermal comfort varies.



DEVELOPMENT OF HIGH STRENGTH CONCRETE BY USING METAKAOLIN AND COPPER SLAG

Er.C.JENIL KUMAR M.E.
Assistant Professor

ABSTRACT

High strength concrete (HSC) is experimentally developed by using Metakaolin as a replacement of cement and copper slag as a replacement of sand. Nine concrete mixtures were prepared with different proportions of copper slag starting from 0% (for the control mix) to 60%. and ready with different proportions of Metakaolin ranging should be 0%, 5% and 10%. Concrete mixes were evaluated for workability, density, compressive strength and sturdiness . The results indicate that there's a small increase within the HSC density of nearly 5% with the rise of copper slag content, whereas the workability increased rapidly with increases in copper slag percentage. Addition of upto 50% of copper slag as sand replacement yielded comparable strength thereupon of the control mix. However, further additions of copper slag caused reduction within the strength thanks to a rise of the free water content within the mix. Mixes with 80% and 100% copper slag replacement gave rock bottom compressive strength value of roughly 80Mpa, which is nearly 16% less than the strength of the control mix. The results also demonstrated that the surface water absorption decreased as copper slag quantity increases upto 40% replacement; beyond that level of replacement, the absorption rate increases rapidly. Therefore, it's recommended that 40% of copper slag are often used as replacement of sand so as to get HSC with good strength and sturdiness properties

1. INTRODUCTION

General:

Concrete is one among the foremost extensively used construction material within the world with an approximate of about two billion tones placed worldwide per annum . it's attractive in many applications due to its considerable strength at a comparatively low cost. Concrete can generally be produced of locally available constituents and may be cast into a good sort of structural configuration and requires minimal maintenance during service. However environmental concern is that the emission of co2 related to cement manufacturing and hence has brought pressure to scale back the cement consumption with the, inventions and usage of Admixtures.

Objective:

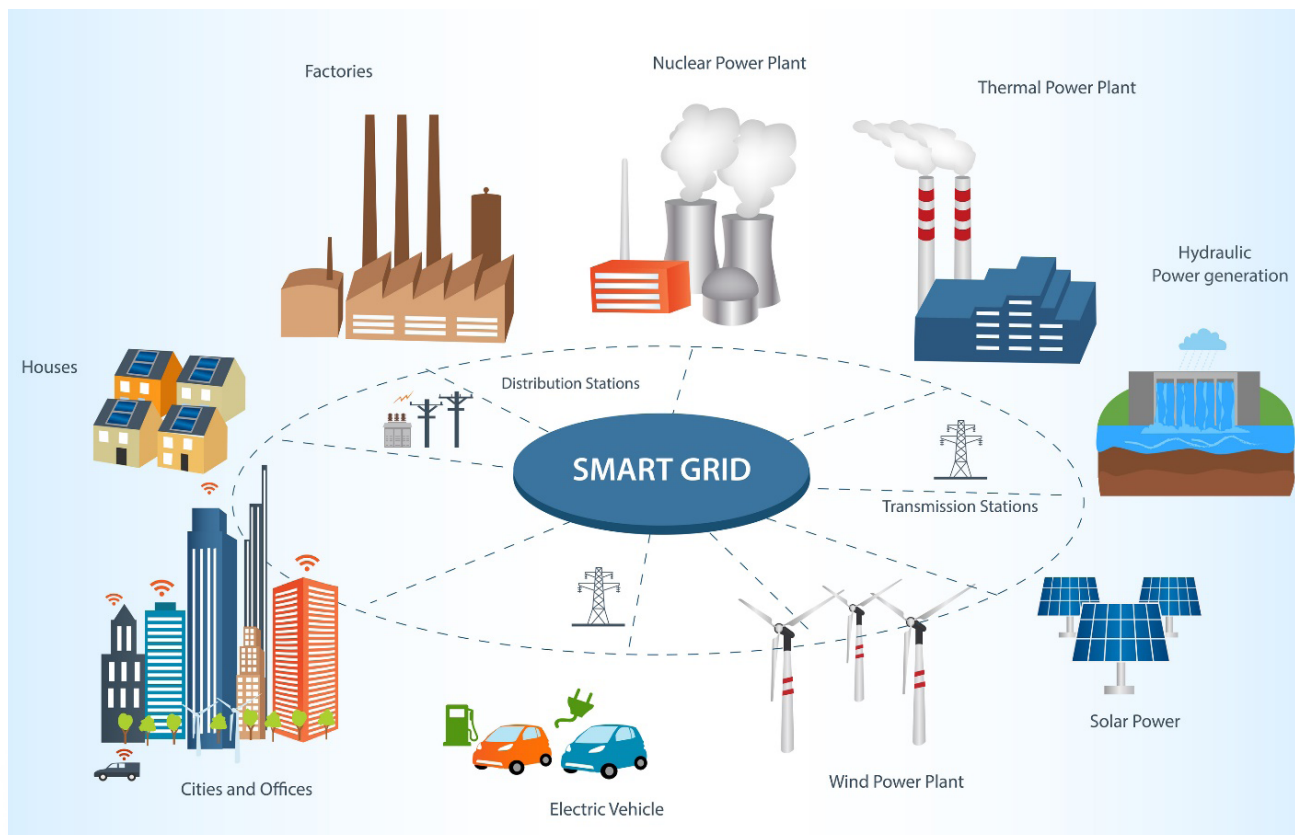
The main objective of this study is to realize high strength concrete by using Metakaolin admixture and its durability. Also the opposite objective is to review the behavior of concrete by using copper slag as a substitute for sand and its durability. This study also includes the performance of concrete by using both Metakaolin and copper slag with reference to compressive strength, and its durability – a primary of its kind. The proportions of both of those are chosen supported the available literatures as discussed within the below.

Admixture:

Admixtures are ingredients aside from water, aggregates that are added to the concrete batch immediately before or during mixing. a correct use of admixtures offers certain beneficial effects to concrete including improved quality, acceleration or retardation of setting time, enhanced frost and sulphate resistance, control of strength development, improved workability and enhanced finish ability. Types: Chemical admixture, Mineral admixture. Chemical admixtures are the ingredients in concrete aside from hydraulic cement , water and aggregate those are added to combine immediately before or during mixing. These admixtures are added to make sure the standard of concrete during mixing transporting, placing and curing and to beat certain emergencies during concrete operations.

INTEGRATION OF ELECTRIC VEHICLES INTO A SMART POWER GRID

Er.Z.JENNER M.E.
Assistant Professor



More than 60% of the world's oil productions are consumed by vehicles on roads. The vehicles are responsible for 30% of the world's total energy consumptions and 27% of total greenhouse gas emissions. Therefore, to reduce emissions originated due to the use of petrol or diesel, grid-connected vehicles have been recognized as one of the effective options. However, if we introduce a large number of grid-connected vehicles technical problems arise and it affects the entire power system, especially the low voltage section. These demanding situations are studied in numerous subsections of an electricity system inclusive of the operation of power electronics equipment, supply-demand imbalance, and impacts on voltage and frequency. The integration of Vehicle to Grid had led to an opportunity for implementing the smart power distribution by offering renewable energy storages, two-way communication, and reactive and active power injections to the grid.

RAINWATER HARVESTING SYSTEM

Ar.M.PRIYADARSHINI M.Arch
Assistant Professor

Ground water recharge in urban areas:

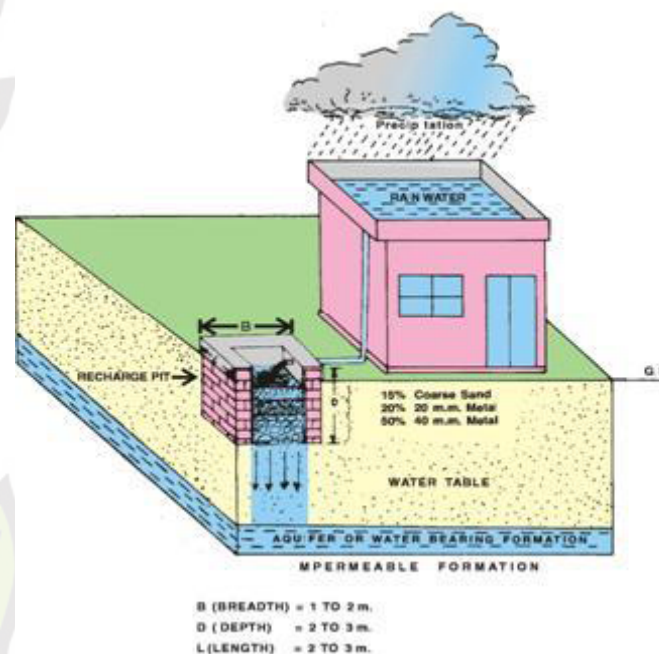
In urban zones, the rain water available from roof tops of buildings, paved and unpaved areas goes as waste.

This water are often recharged to aquifer and may be utilized gainfully at the time of need. The rain water harvesting system must be designed during a way that it doesn't occupy large space for collection and recharge system.

Recharge Pit:

In alluvial areas where permeable rocks are exposed on the land surface or are located at very shallow depth, rain water harvesting are often done through recharge pits.

This technique is suitable for buildings having a roof area of 100 sq.m. These are constructed for recharging the shallow aquifers.



Recharge Pits could also be of any shape and size. They are generally constructed 1 to 2 m. wide and 2 to 3 m deep. The pits are filled with boulders (5-20 cm), gravels (5-10mm) and coarse sand (1.5- 2mm) in graded form. Boulders at rock bottom , gravels in between and coarse sand at the highest in order that the silt content which will accompany runoff water are going to be deposited on the top of the coarse sand layer and may easily be removed. For smaller roof area, pit could also be crammed with broken bricks/ cobbles.

A mesh should be provided at the roof in order that leaves or the other solid waste/debris is prevented from entering below. A de-silting /collection chamber can also be provided at the bottom to arrest the flow of finer particles to the recharge pit. The top layer of sand should be cleaned periodically to take care of the recharge rate. By-pass arrangement is to be provided before the gathering chamber to reject the primary showers.

SELF-HEALING CONCRETE

Er.R.RELIN GEO M.E.
Assistant Professor

When bacterial spores were directly added to the concrete mixture, their lifetime appeared to be limited to one-two months. The decrease in life-time of the bacterial spores from several decades when in dry state to only a few months when embedded in the concrete matrix may be due to continuing cement hydration resulting in matrix pore-diameter widths typically much smaller than the 1- μm sized bacterial spores. Another concern is whether direct addition of organic bio-mineral precursor compounds to the concrete mixture will not result in unwanted loss of other concrete properties. So, in order to overcome this drawback encapsulation of the bacteria and the precursor has to be done.

The clay pellets must have the following characteristics before placing the healing agents into it:

1. The pellets must be able to sustain the continuous and rigorous mixing process.
2. At the same, they must be brittle enough to break during the crack formation.
3. The pellets must bind properly with the rest of the paste.
4. The pellets must allow the dissemination of bacteria and calcium lactate once it ruptures.
5. Apart from that, they must provide good thermal insulation, moisture impermeability, fire resistance and neutral pH.

The clay pellets not only represent an internal reservoir but also constitute both a structural element of concrete as well as a protective matrix for the self-healing agent. The clay pellets are lightweight and are less than 2mm in size. These pellets are heated into a rotary kiln for about 1000°C, which allows its expansion and thus formation of tiny pores or bubbles within it used for the accommodation of the process precursors. Note that adequate moisture and oxygen is necessary for the growth of the bacterium which is absent during the mixing process. Dr. Nele De Belie, has published a paper on Healing and Self-Healing of Concrete, has shown during their presentation how repair and consolidation of mineral phases of building materials and the healing and self-healing of concrete with the help of bacteria is possible.

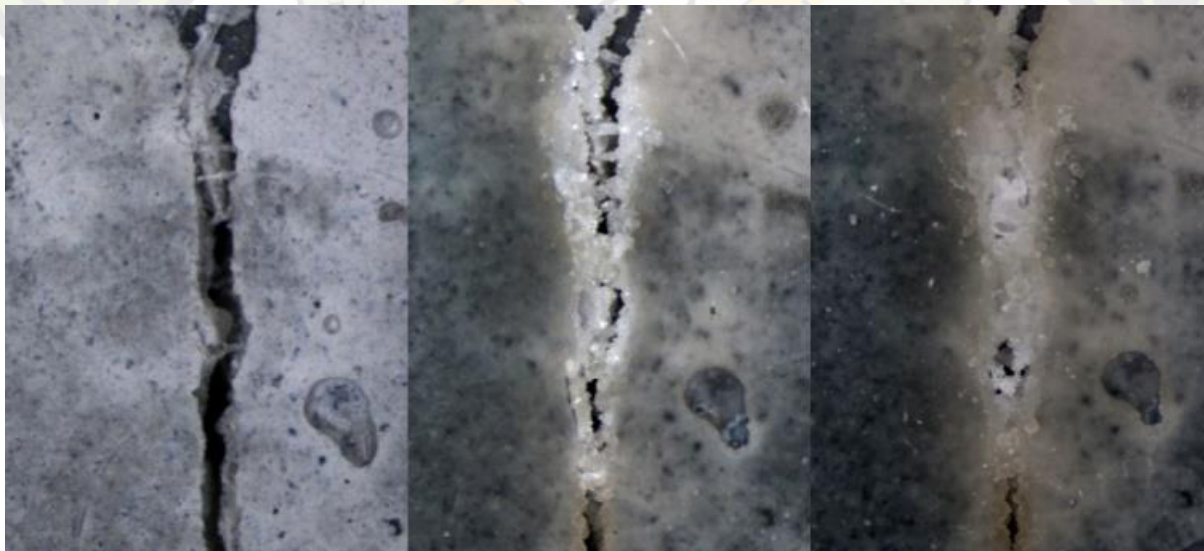


Fig. Self-healing concrete

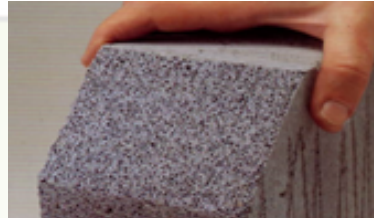
SUSTAINABLE BUILDING MATERIALS FOR CONSTRUCTION PART I

Er.E.M.JERIN SHIBU M.E.
Assistant Professor



Aircrete Blocks

They are available in a wide range of sizes, have a range of densities (typically 460 kg/m^3 to 770 kg/m^3), compressive strength (2.9 to 9.0 N/mm^2) and thermal conductivity values (typically grouped as 0.11 , 0.15 and 0.19 W/mK) and can be constructed using conventional mortar or the thin-joint technique.



Recycled Aggregates

Recycled Aggregates is a term that describes crushed cement concrete or asphalt pavement from construction debris that is reused in other building projects.



Building Insulation

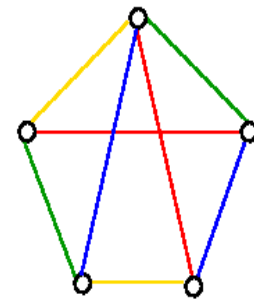
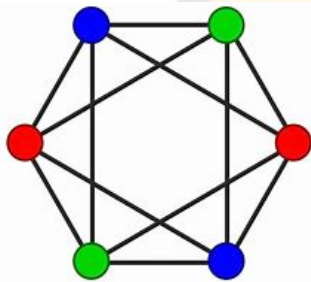
Building insulation is any object in a building used as insulation for any purpose. While the majority of insulation in buildings is for thermal purposes, the term also applies to acoustic insulation, fire insulation and impact insulation (e.g. for vibrations caused by industrial applications). Often an insulation material will be chosen for its ability to perform several of these functions at once.



COLORING IN GRAPH THEORY

Ms.R.MARIA ANUSHIYA M.Sc
Assistant Professor

Vertex coloring is associate in nursing assignment of colours to the vertices of a graph ‘G’ such no two adjacent vertices have a same color. Chromatic number is the minimum variety of colors needed to properly color any graph. Graph theory is beneficial in several applications and these applications area unit wide employed in world. An edge coloring of a graph G is an assignment of colors to the edges of G such that edges with a common endpoint have different colors.



4-edges-coloring

Vertex coloring

Sudoku could be a logic puzzle within which there are 81 vertices, one vertex for Every cell which is filled with numbers between 1 and 9. In every row, the numbers 1,2, ...,9 should seem while not repetition. Likewise the numbers must appear without repetition in the colourum. By using this coloring method we can solve the puzzle easily

Puzzle

8	5	6		1	4	7	3	
	9							
2	4					1	6	
	6	2		5	9	3		
	3	1	8		2	4	5	
		5	3	4		9	2	
	2	4					7	3
							1	
	1	8	6	3		2	9	4

Solve

Clear

Solution

8	5	6	2	1	4	7	3	9
1	9	3	5	7	6	8	4	2
2	4	7	9	8	3	1	6	5
4	6	2	7	5	9	3	8	1
9	3	1	8	6	2	4	5	7
7	8	5	3	4	1	9	2	6
6	2	4	1	9	8	5	7	3
3	7	9	4	2	5	6	1	8
5	1	8	6	3	7	2	9	4

3D PRINTING FOR RESIDENTIAL IS MARKET-READY: GERMANY'S FIRST BUILDING IS UNDER CONSTRUCTION

Ar.K.KEERTHANA B.Arch
Assistant Professor



The first 3D printed residential building in Germany, built by PERI GmbH, and designed by MENSE-KORTE ingenieure+architekten is undergoing construction in Beckum, North Rhine-Westphalia. The two-story printed single dwelling with approx. 80 sqm of lebensraum per floor is employing a system put into practice in Germany for the first time. In fact, the event technique has come through all of the regulatory approval processes over the previous few weeks and months.

3D printing technology for residential construction is now market-ready. a part of North Rhine-Westphalia's "Innovatives Bauen" or innovative construction development scheme, the primary residential 3D printed building is under construction in Germany. together with Schießl Gehlen Sodeikat, the Technical University of Munich, and MENSE-KORTE ingenieure+architekten, the two-story home is being built for the client Hous3Druck GmbH. A milestone for 3D construction printing technology, the development of the 3D-printed residential building in Beckum, has engendered other residential printing projects to be involved in Germany, consistent with Thomas Imbacher, Innovation & Marketing Director at PERI GmbH.

STOCHASTIC PROCESSES CONNECTING ARCHITECTURE AN- INTRODUCTION

Mr.P.S.STEM EDILBER M.Sc,M.Phil
Assistant Professor

To realize human-like robot intelligence, a large-scale cognitive architecture is required for robots to understand their environment through a variety of sensors with which they are equipped. In this paper, we propose a novel framework that enables the construction of a large-scale generative model and its inferences easily by connecting sub-modules in order for robots to acquire various capabilities through interactions with their environment and others. We consider it important for robots to understand the real world by learning from their environment and others, and have proposed a method that enables robots to acquire concepts and language based on the clustering of multimodal information that they obtain. These proposed models are based on Bayesian models with complex structures, and we derived and implemented the parameter estimation equations. If we realize a model that enables robots to learn more complicated capabilities, we have to construct a more complicated model, and derive and implement equations for parameter estimation. However, it is difficult to construct higher-level cognitive models by leveraging this approach. Alternatively, these models can be interpreted as a composition of more fundamental Bayesian models. In this paper, we develop a large-scale cognitive model by connecting the Bayesian models and propose an architecture named Serket (Symbol Emergence in Robotics tool KIT1), which enables the easier construction of such models. In the field of cognitive science, cognitive architectures have been proposed to implement human cognitive mechanisms by describing human perception, judgment, and decision-making. However, complex machine learning algorithms have not yet been introduced, which makes it difficult to implement our proposed models. Serket makes it possible to implement more complex models by connecting modules. One approach to develop a large-scale cognitive model is the use of probabilistic programming languages (PPLs), which make it easy to construct Bayesian models. PPLs can construct Bayesian models by defining the dependencies between random variables, and the parameters are automatically estimated without having to derive the equations for them. By using PPLs, it is easy to construct relatively small-scale models, such as a Gaussian mixture model and latent Dirichlet allocation, but it is still difficult to model multimodal sensory information, such as images and speech obtained by the robots. Because of this, we implemented models for concept and language acquisition, which are relatively large-scale models, as standalone models without PPLs. However, we consider the approach where an entire model is implemented by itself has limitations if it is constructed as a large-scale model. Large-scale cognitive models can be constructed by connecting smaller fundamental models hierarchically; in fact, our proposed models have such a structure. In the proposed novel architecture Serket, large-scale models were constructed by hierarchically connecting smaller-scale Bayesian models (hereafter, each one is referred to as a module) while maintaining their programmatic independence. The connected modules are dependent on each other, and parameters must be optimized as a whole. When models are constructed by themselves, the parameter estimation equations have to be derived and implemented depending on the models. However, in this paper, we propose a method for parameter estimation by communicating the minimum parameters between various modules while maintaining their programmatic independence. Therefore, Serket makes it easy to construct large-scale models and estimate their parameters by connecting modules

NEW ORLEANS ARCHITECTURAL STYLE

Ar.T.JOSEPHINE SABEENA B.Arch
Assistant Professor

As one of the oldest and most culturally diverse cities in the country, New Orleans is an architectural marvel. Walk the streets of the French Quarter and you'll find Creole cottages, shotgun houses, and Beaux-Arts masterpieces. Venture into other parts of the city for modern museums, stately mansions, and restored Art Deco gems. Each building offers up something unique and fascinating to come up with some of favorites, each with a unique story.



New Orleans possesses an abundance of historic architecture constructed over a period spanning almost three hundred years. The City is home to more than twenty National Register historic districts, fifteen local Historic Districts, and scores of local and national Landmark buildings. Almost half of the buildings New Orleanians call home were built before World War II, the earliest dating from the 18th century. As a result, the City has a diversity of architectural styles and types, of buildings both grand and small, unrivalled in the nation. As importantly, New Orleans is home to architectural styles and types that are closely tied to the image of the City, and that appear in New Orleans in numbers and combinations unseen in other places.

DAVID CHIPPERFIELD AND ENZO ENEA DESIGN A LUXURY LAKE RETREAT IN GERMANY

Ar.T.DINESH PANDIAN M.Arch
Assistant Professor



David Chipperfield Architects and landscape architect Enzo Enea have designed a luxury residential retreat on the shores of Lake Scharmützsee in Germany. Dubbed the Marina Apartments, the project was created for Artprojekt Group as an exclusive development in Bad Saarow. Opening up to nearby forests and the waterfront, the project was designed to be in harmony with nature.

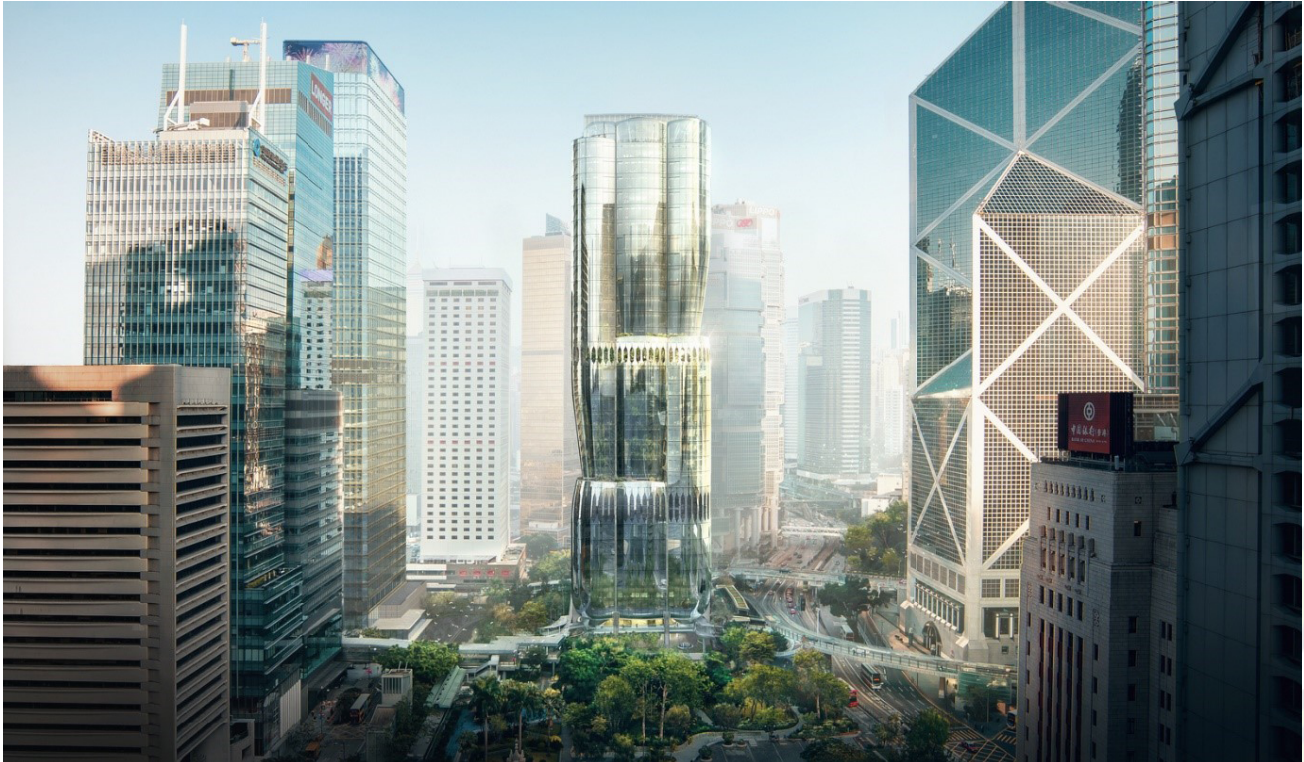
Conceptually, the Marina Apartments are inspired by the tradition of 20th century reform blocks at the beginning of Berlin Modernism. As the team states, the ensemble makes reference to the founding period of the Saarow-Pieskow country house colony designed by Ludwig Lesser. The apartments are made of five cubic structures in a pine forest sloping down to the lake. David Chipperfield noted that, «The location is more important than the architecture.»

Four of the five multi-story structures house 45 vacation apartments with vertical facade formwork in dark wood. The remaining building is designed with eight condominiums in natural stone masonry and gabled roofs.

REPLACING A MULTI-STORY CAR PARK IN HONG KONG

Ar.K.ASWIN PRAKESH M.Arch
Assistant Professor

Zaha Hadid Architects has revealed its design for the 36-story Murray Road project for Henderson Land, in the heart of Hong Kong's central business district. Creating new civic plazas enveloped by nature, the urban oasis is located in proximity to both Central and Admiralty MTR metro stations.



Replacing a multi-story car park, the development is connected to adjacent public gardens and parks, through an elevated base sheltering courtyards cultivated with trees and plants. These outdoor areas seamlessly flow into the communal spaces of the interior. Inspired by the structural forms and layering of a Bauhinia bud about to blossom, known as the Hong Kong orchid tree, the design generates a very wide span of naturally lit, column-free, Grade A office space with a 5-meter floor-to-floor height giving maximum flexibility.

The façade, designed to withstand summer typhoons, includes 4-ply of double-laminated, double-curved insulated glass units, in order to insulate effectively the building and reduce its cooling load as well as build resilience. Moreover, “hybrid ventilation is controlled by the building’s automated management system and enables all office levels to be naturally ventilated”. In fact, smart systems learn to accurately predict daily occupancy trends to optimize energy demand, ensuring increased efficiencies with lower energy consumption.

On another hand, two weather stations, connected to the building’s automated management system and installed at street level and roof level will monitor real-time outdoor conditions, informing occupants of outdoor air quality. “A 26% reduction in electricity demand will be achieved with the use of smart chiller plant optimization, high-efficiency HVAC equipment, and daylight sensors that reduce artificial lighting during periods of sufficient natural light”. Achieving LEED Platinum and WELL Platinum pre-certification together with the highest 3-Star rating of China’s Green Building Rating Program, the project is targeting full certification at occupancy.

CONNECTING MINDS, CREATING THE FUTURE


Ar.G.Gnana Shini B.Arch
Assistant Professor

Initially, the World's Fair was established in 1851 as an initiative to present several achievements and inventions to the common people around the world under a single roof. Several numbers of inventions have been exhibited in all fields including architecture, science, and so on. The major accomplishments include Crystal Palace, the telephone, the Eiffel Tower, the Ferris wheel. The world's fair has been conducted in major cities throughout the world. With its name changed as World's Expo, the exhibition is being conducted in huge acres of land in which different countries tend to create pavilions that emphasize the culture of the country and also use of innovative building techniques. Dubai Expo 2020 has also been created with such a motive to exemplify the architectural magnificence of Dubai. The expo has been created with the theme "Connecting Minds, Creating the Future" by HOK Architects, a firm based in America. This exhibition also elevates the status of Dubai as a global city in terms of world-class infrastructure and the adaptation of sustainability guidelines. One of the highlights of the exhibition is the master plan designed by the firm HOK. The master plan is designed in such a way to celebrate traditional Emirate culture and community while looking into the future. The exhibition is planned between the cities of Dubai and Abu Dhabi with around 193 pavilions hosted by the firm over an area of 1083 acres. The entire master plan is divided into three districts based on the theme: Opportunity, Mobility, and Sustainability. The three districts are zone emerges out of a central plaza named Al Wasl, a historic Arabic word which means "connection". The concept is inspired by the layout of the Arabic marketplace which means "souk". The larger pavilions are placed at the perimeter of the districts while small exhibition places clustered towards the center while paving a way for pedestrians and to create a social space for interaction. In terms of sustainability, the entire site is made as a benchmark of sustainability by the use of materials, technologies, and techniques. A photovoltaic fabric system is used as cover to shade the main walkways which serve a dual purpose. In the same way, the facades of the pavilions are made to have photovoltaic panels to capture enough sunlight which can be used to full fill nearly half of the energy demands of the exhibition site. Interestingly, the photovoltaic fabrics will be illuminated to display lights or any digital projections.



Other sustainable techniques such as recycling wastewater, reuse of materials and importantly monitoring the carbon footprint of the site.



 +91- 9443370072

 Sigma college of architecture

 www.sicarch.com

 sigmagroup155@gmail.com



Prof. Dr. T. James Wilson

B.E., M.I. Mar. Tech., MISTE, MBA., Ph.D.

CHAIRMAN

9443370072, 9750976611, 9443370058,

8012561000, 9750976622